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As one of its major activities in carrying out its purpose, the Society publishes a monthly magazine, the Canadian Geographical Journal, which is devoted to every phase of geography—historical, physical and economic—of Canada, of the British Commonwealth and of the other parts of the world in which Canada has special interest. It is the intention to publish articles in this magazine that will be popular in character, easily read, well illustrated and educational to the young, as well as informative to the adult.

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CONTENTS

MAY, 1950 ✦ VOLUME XXXX ✦ NUMBER 5

COVER SUBJECT: — *Virginia Rail — (See Page 236)*
Colour photograph by W. V. CRICH

Page

UNITED KINGDOM TRADE WITH CANADA 194
by E. P. WEEKS

PAPAIN PRODUCTION IN EAST AFRICA . . 206

A RIVER IN HARNESS 210
by B. J. McGUIRE

JOHN CLARENCE WEBSTER 232
by ROBERT J. C. STEAD

EDITOR'S NOTE-BOOK XI

AMONGST THE NEW BOOKS XI

✦

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British manufactured cotton goods are exported in many forms besides fashion fabrics. This picture shows a pile of medical gauze in a Lancashire mill. After bleaching, the gauze is opened out to its original width before it is dried and finished.

The first all-jet airliner. It is a de Havilland "Comet" with a cruising speed of about 500 miles per hour.

United Kingdom Trade With Canada

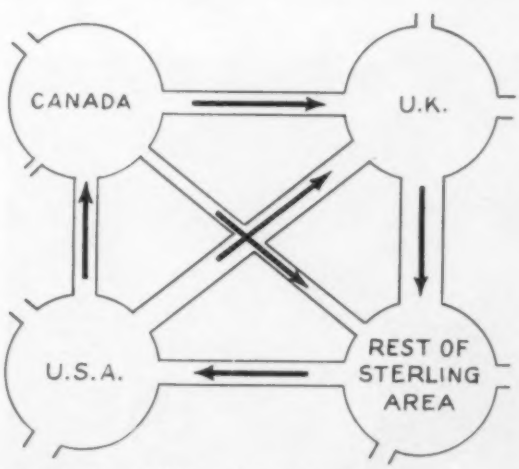
by E. P. WEEKS*

Photographs by courtesy of the United Kingdom Information Office

THIS ARTICLE CONSIDERS Anglo-Canadian trade relationships in the light of the prewar pattern, the difficulties caused by the war, and the measures which are being adopted to overcome these difficulties.

The Prewar Picture

Before the war, Canada and the United Kingdom were important elements in a complex system of the multilateral exchange of goods which was made possible by the mutual convertibility of currencies. This allowed a given country to use its surplus with one area to cover a deficit with another area. Thus, Canada in 1938 had a surplus on current account of $127 million with the United Kingdom and a deficit of $149 million with the United States. Through the system referred to, Canada was able to apply the credits with the United Kingdom and other countries to meet the United States debit. The accompanying diagram illustrates the situation. Three points in the diagram deserve special notice. Firstly, it was the United Kingdom's over-all surplus with the rest of the Sterling Area which indirectly enabled her to buy more from the United States, Canada and Europe than she sold to those three areas. Secondly, her adverse balance with North America depended in equal measure upon the rest of the Sterling Area having a considerable surplus with the



*Incorporating material prepared for the Journal by John Kingsley, British writer on economics.

Ball-bearings. Steel ball and roller bearings are an essential part of the machine world and are used in countless industries.

United States. Thirdly, Canada's ability to buy more from the United States than she sold and to sell more to the United Kingdom than she bought also depended on these two other surpluses.

The relations between Canada and the United Kingdom in the prewar trading pattern were due largely to the fact that the two economies are in many ways complementary. Canada, although endowed with vast natural resources and an efficient manufacturing industry, is not self-sufficient in a number of the materials and finished goods essential for the maintenance of her high standard of living. Britain has long been the supplier of manufactures to the world, and cannot maintain her large population without very heavy imports of raw materials and foodstuffs. There is thus the economic basis for profitable exchange.

The Postwar Problems

The war undermined the basis of the previous arrangements in three main ways. Britain's heavy loss of overseas investments and earnings from shipping and other services necessitated a higher postwar level of exports of goods and services than before to pay for essential imports. In the second place, the virtual abandonment of export trade during the war, together with the costs of war, particularly in India and the Middle East, created vast sterling debts. The repayment of these debts involves a considerable volume of exports for which there is no return. Finally, the Japanese conquest of South East Asia and the unsettled conditions which followed it served to eliminate or reduce the surplus of the rest of the Sterling Area with the United States. As a result of these changes, Britain could no longer pay for her net imports from North America in the prewar fashion.

The result of all this is the painful situation which we see today. For example, Canadian apples, once a common sight in British stores, are now comparatively rare, while the Canadian growers search for an alternative market. Canadian lumbermen, too, are facing difficulties because the British, under the pressure of the dollar shortage, are making wider use of reinforced concrete and other substitutes and have considerably reduced their total lumber imports.

Canada's dollar problem has arisen because of the inconvertibility of sterling resulting from the disruption of the old trading system. One of the ways of resolving this problem would appear to be Canada's importation of more of her requirements from the non-dollar area in which the United

Glass blowing, seen through a piece of blown glass. Most glass is now blown in moulds rather than by this method of mouth blowing and hand manipulation.

Kingdom is the largest actual and potential supplier. Canada is the greatest importer of manufactured goods in the world and the United Kingdom can supply her with a wide range of producers' and consumers' goods at competitive prices.

The Import-Export Position of the United Kingdom

The British people have accomplished great things since the end of the war. In 1949 they were able, on their overseas account, to reduce the adverse balances of payments of $2,539 million in 1947 and $406 million in 1948 to about $210 million. Already the United Kingdom has achieved a substantial sterling surplus in its trading with the Sterling Area, but there remains a formidable deficit on dollar account amounting in 1949 to no less than $825 million. Such a deficit could only be carried with the help of the exceptional assistance received from the United States and Canada.

The expansion in total exports was most encouraging up to the second quarter of 1949 and the total volume for 1948 was 136 per cent of the 1938 level, an increase of about one quarter over 1947. At the same time, net invisible income yielded a surplus of $395 million in both 1948 and 1949 as against a deficit in 1947 of $762 million. In the first quarter of 1949, the volume index reached 156 but fell in the second quarter to 146 and in the third quarter to 142. After devaluation, the volume of U.K. exports jumped to 159 in the last quarter of 1949 and a further record has been reached in 1950, which has so far topped 1949 by 17 per cent. In striking contrast, the volume of imports has been held down to 80-90 per cent of prewar.

In spite of the marked improvement in its over-all world trade, the United Kingdom current payments with North America have continued to be heavily adverse. Because the United Kingdom is banker for the Sterling Area, her balance of payments is inextricably involved with that of the Area as a whole. After an improvement in the Sterling Area gold and dollar deficit position between the first quarter of 1948 when it was $592

Throwing pottery at the Wedgwood works.

Hand decorating Copeland porcelain.

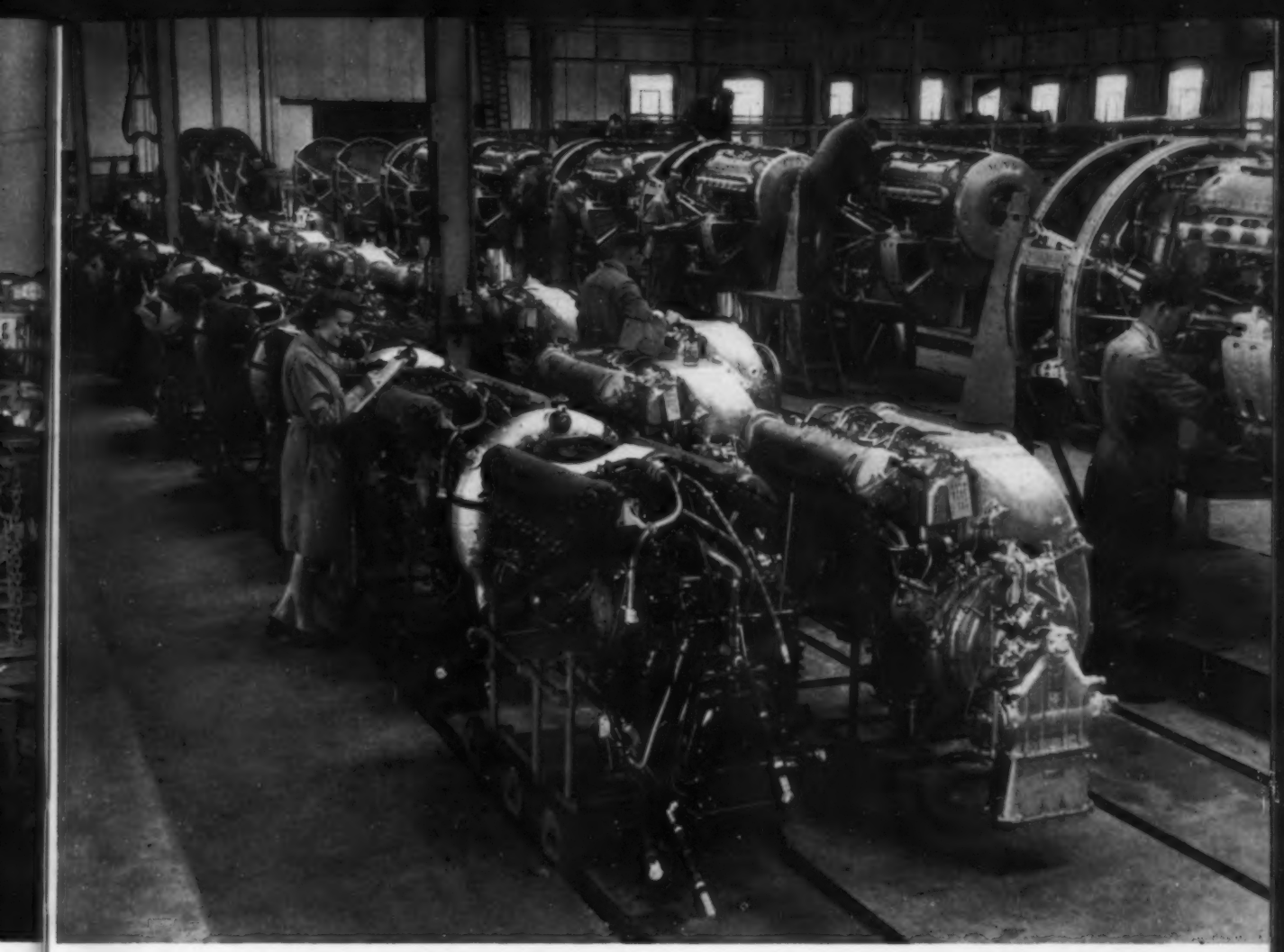
Creating designs for British glassware.

One of two 80,000 h.p. transformers, part of an electrical plant to be sent to Canada.

Cutting giant gear-wheels for a sugar beet hopper.

million, and the first quarter of 1949 when it was down to $330 million, there was a sharp deterioration in the second quarter of 1949. The third quarter deficit rose quickly to $632 million, the increase being due in part to a reduction in sales to North America. Total reserves dropped to $1,425 million by the end of September as against a suggested minimum safety level of some $2,200 million. As a result, the pound has been devalued by 30.5 per cent as against the U.S. dollar and 23.6 per cent as against the Canadian dollar. Prior to devaluation, in July, it had been decided at a meeting of Commonwealth Finance Ministers that the Sterling Area should seek to reduce imports from dollar countries by 25 per cent.

The general effect of the devaluation is expected to be in the direction of re-estab-



Piston aero-engines and turbo-jet power-units on the erection lines at the Rolls-Royce plant.

lishing a healthier long-term pattern of trade. The more immediate result will tend to be the expansion in Sterling Area exports to North America and a further restriction of imports particularly from the United States. Exporters in the Sterling Area now have a sharp incentive to export to North America in preference to other markets, but the volume of exports will have to be increased very substantially to earn a greater value of dollars than was obtained before devaluation. It must be expected, therefore, that some time will elapse before earnings are sufficient to rebuild reserves to a satisfactory level and to allow for an expansion in purchases from North America. Devaluation has already stopped the drain on dollar reserves which went up by $263 million between the date of devaluation and Decem-

Hillman cars ready for dispatch at the factory.

ber 31, 1949, and by a further $296 million in the first quarter of 1950. Sales to both Canada and the United States have improved, but not yet sufficiently to earn as many dollars as a year ago.

The Market for Canadian Goods

The inevitable curtailment of the import requirements of the British people has checked the great rise in Canadian exports to this market which was a result of the exceptional wartime demands. Despite this, the 1949 total was not much down at $709 million in 1949 as compared with $751 million in 1947. The principal imports from Canada were as shown below.

It is noteworthy that the 1949 list is roughly in the same order of importance as that of 1938. The needs of the United Kingdom market show all signs of permanence; the vital question is how much can be paid for. Canada has long been the United Kingdom's largest source of supply accounting for some 10 per cent in 1949 as against 9 per cent before the war.

Although this article deals primarily with United Kingdom-Canada trade, one cannot avoid mention of the importance of the rest of the Sterling Area, the countries of which taken together form the third largest market for Canadian goods and the third supplier of Canada's imports. The Sterling Area has very great resources of primary materials such as tin, bauxite, rubber, wool, sugar and vegetable oils. Canada already imports large quantities of many of these commodities, but she should in the course of her own development be able to take increased amounts in the future. In return, the Sterling Area could absorb valuable quantities of Canada's finished manufactures as well as her primary products.

Principal United Kingdom Imports from Canada[1]
Millions of dollars

	1938	1947	1948	1949[2]	Per cent of total imports of each commodity, 1949
Grain and flour	91.4	359.3	345.1	398.4	57.3
Non-ferrous metals and manufactures	72.6	90.0	115.5	127.2	34.5
Wood and timber	34.9	167.0	107.8	87.4	22.8
Meat (mainly bacon)	34.2	78.7	91.8	16.0	3.0
Dairy produce	14.7	58.5	53.3	38.6	5.7
Paper-making materials	4.3	17.5	26.9	24.0	12.7

Source: Accounts relating to the Trade and Navigation of the United Kingdom.

[1]These figures have been converted into Canadian dollars at the following rates: 1938, $4.961—£1; 1947, 1948 and nine months, 1949, $4.03—£1; October and November, 1949, $3.08—£1.

[2]Full year 1949 estimated from eleven months.

British miners in a pithead canteen. Industry depends largely on the output of the coal mines.

Canada as a Market for United Kingdom Goods

Canada, in 1949, was the fourth largest import market in the world, ranking only behind the United States, United Kingdom and France. In 1938, the United States supplied 63 per cent of Canada's imports and in 1949, 74 per cent. The United Kingdom, which came second in 1938, with 18 per

A Welsh coal valley takes on a new appearance as factories for light industries are built where slag heaps used to mar the landscape.

cent was still second in 1949 with 11 per cent. It is clear that progress is being made toward the recovery of the prewar position since the figure was only 7 per cent in 1947. The composition of Canada's import trade is shown in the following table below.

The principal kinds of United Kingdom goods traditionally marketed in Canada are indicated in the table given below. This range can be broadened considerably, especially in the field of capital goods. In this connection, the United Kingdom has been making great efforts to acquaint Canadian interest with the capacities and achievements of British engineering. British designers, engineers and constructors are accustomed

Canadian Imports by Commodity Groups

Commodity Groups	Total 1949 Imports[1]	Imported from U.K.	Principal items obtained from the United Kingdom in each commodity group
	$ —million	%	
Agricultural and vegetable produce	375.7	5.1	Whiskey, and distilled beverages
Animals and animal products	75.0	8.1	Leather, leather goods and footwear
Fibres, textiles and products	336.6	36.8	Wool and cotton goods, linen and clothing
Wood, wood products and paper	86.7	3.6	Books and periodicals
Iron and its products	907.0	9.2	Machinery and motor vehicles
Non-ferrous metals and products	174.5	11.8	Tin, precious metals and electric goods
Non-metallic minerals and products	533.7	5.2	Pottery, chinaware, glassware and coal
Chemicals and allied products	129.7	6.4	Chemicals and drugs
Miscellaneous commodities	160.4	12.9	Aircraft and sporting goods
Total, 1949	2,779.3	12.5	
Total, 1948	2,636.9	11.4	
Total, 1947	2,573.9	7.4	

Source: Trade of Canada, Dominion Bureau of Statistics.
[1]Full year 1949 estimated from eleven months.

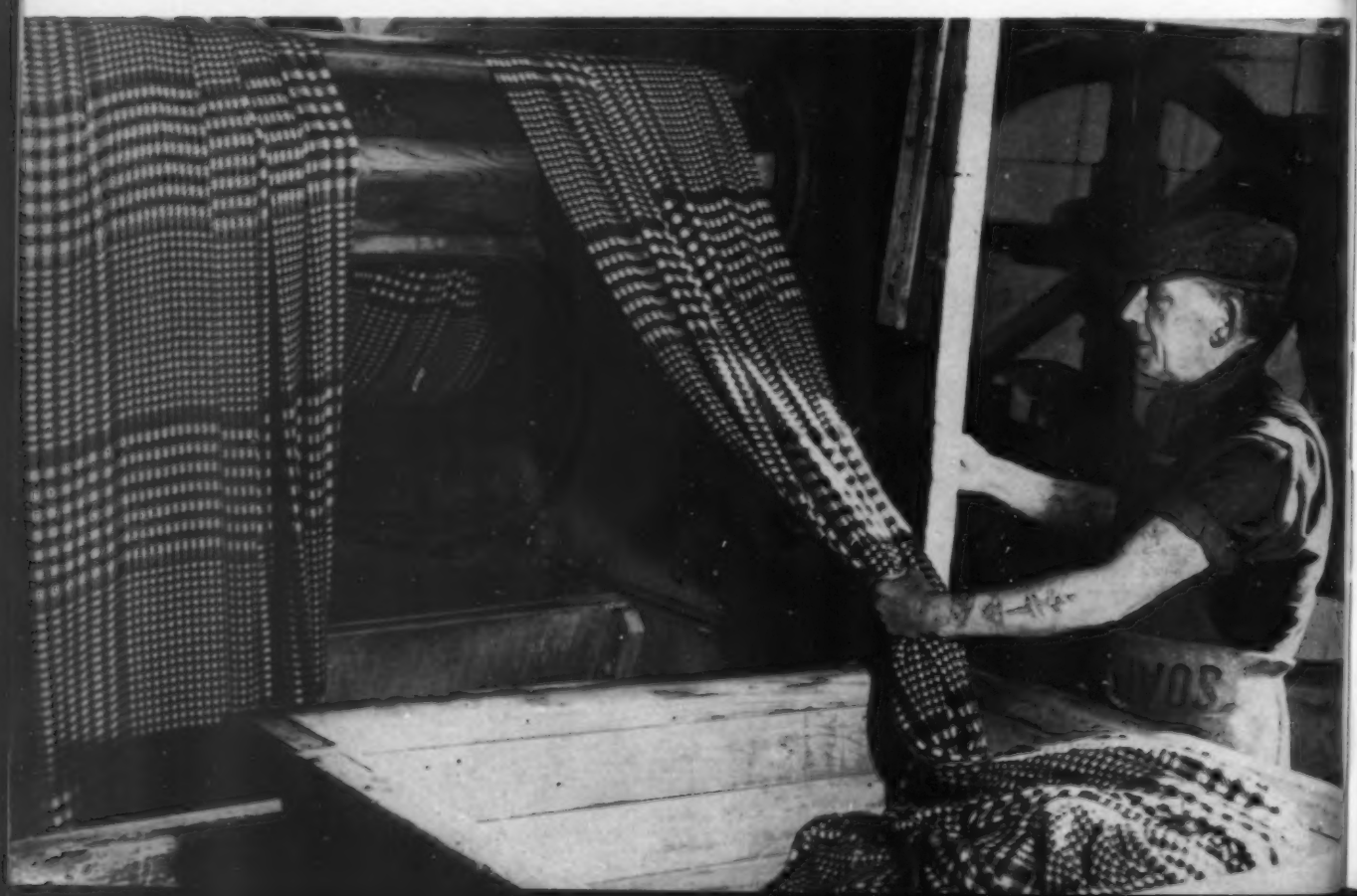
to handling capital projects of the largest size. The United Kingdom should be able to sell increased quantities of steel, heavy machinery, engineering plant and machine tools, as well as to undertake more contracting in Canada.

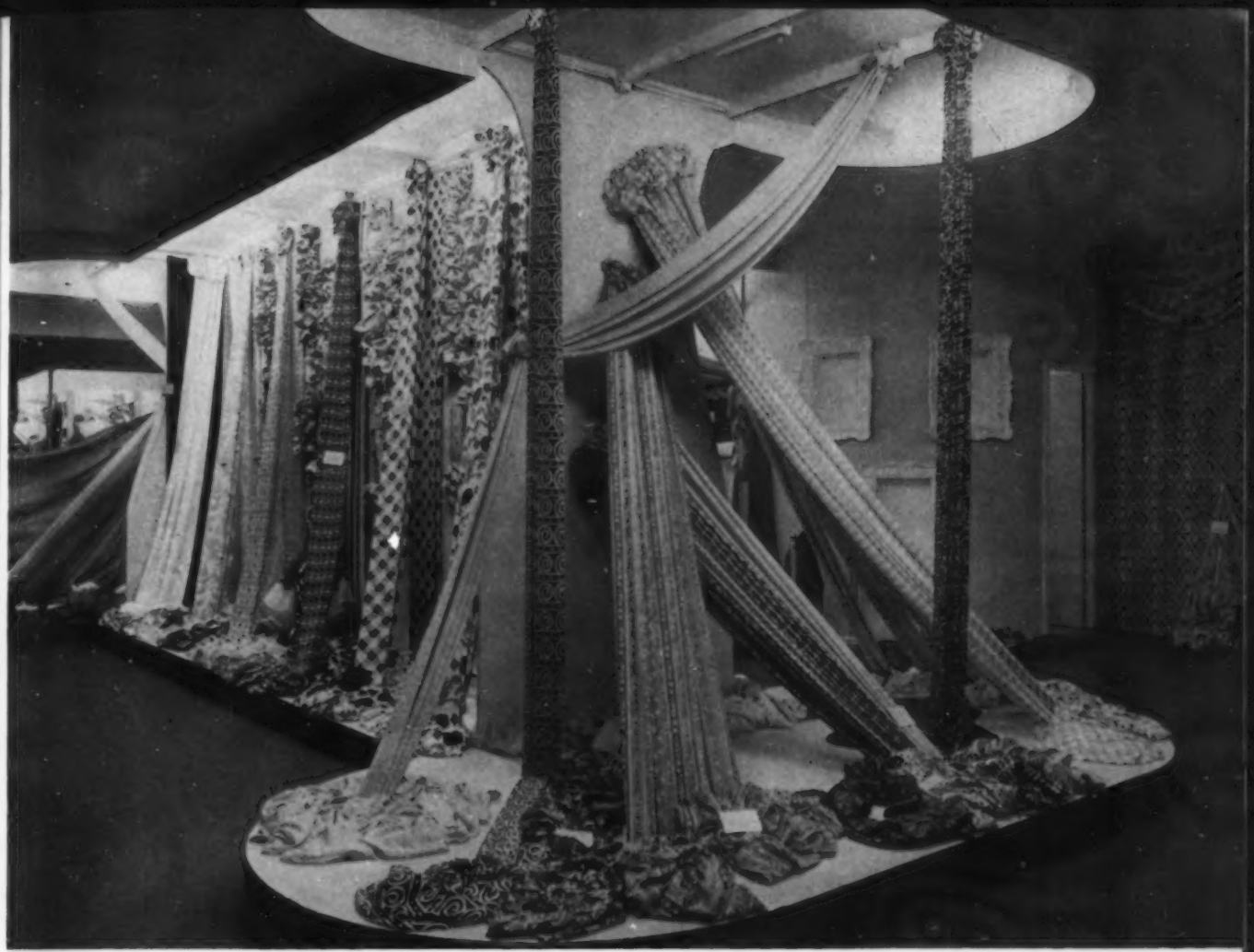
Scientific and medical goods provide instances where the United Kingdom has made great progress in recent years, as, for example, in radar equipment and penicillin. There has been a strong revival of inventive application in the United Kingdom covering not only scientific and medical, but also many other fields. Recent advances will be readily observed by those who visit the annual British Industries Fair in London and Birmingham.

Motor vehicles and tractors have been coming to Canada from the United Kingdom in greatly increased numbers since the war. Indeed the sales of motor vehicles have been

A carpet being woven on a Jacquard Axminster loom.

Scouring and milling woollen fabrics. Water and temperature are controlled automatically.





Fabrics on display at the British Industries Fair, an annual event held in London and Birmingham.

so successful that in 1949 nearly 34,000 were absorbed by the Canadian market, as compared with 2,164 in 1947 and 686 in 1939.

It is expected that there will be a large increase in the number of Canadian tourists going to the United Kingdom, especially since the devaluation of the pound has made visits cheaper. Improved air transport facilities are encouraging more travel and the United Kingdom has been paying considerable attention to its reception arrangements. All tourist-receiving ports have been visited by an official committee. Hotels have been granted extra materials in order to rebuild and replenish after war damage. A generous gasoline allowance is supplied to Canadian visitors in contrast to the rationed scale for the British motorist. Some retail goods are reserved for overseas visitors, and all purchases can be made free of purchase tax under the personal export scheme. Food in the hotels is good and varied.

Incentives to Export to Canada

"Open favouritism" in meeting production difficulties was promised to exporters by the President of the Board of Trade in the British House of Commons, 11th April 1949.

Discrimination in the supply of raw materials is one method used. Another is the reservation of all production, or a high proportion of it, for export to North America—cashmere cloth and whisky are instances of almost complete reservation. Another is to allow manufacturers to sell a larger proportion of their output on the domestic market if they achieve a high rate of export to North American destinations; this system has recently been applied to glassware. Yet another

method, although only used so far in the case of foods for processing, is to supply the raw materials at world market prices instead of at domestic prices in cases where domestic prices are kept artificially high through assistance to home producers. Finally, the British government is continually reminding manufacturers and distributors of the urgent national need for them to export to Canada and the United States.

The devaluation of the pound will help British exporters to lower their prices in the highly competitive Canadian market, and they will have a strong economic incentive to enter that market. But the price reduction will not be to the full degree indicated by the 23.6 per cent drop in the exchange rate since United Kingdom costs are bound to rise. Most of its raw materials are imported, and the prices of these have risen by proportions varying all the way up to the full extent of the 30.5 per cent devaluation of the pound in terms of the United States dollar.

The question of delivery and servicing is, of course, vital as well as price. To ensure delivery the President of the Board of Trade stated that it would be necessary in many instances to place orders from Canada right at the top of the list, often giving them priority over orders accepted from other countries.

The competitive position of the British industry must ultimately depend upon its productivity and efficiency. Never before has so much serious consideration been given to this question, nor have so many practical steps been taken on a national scale. The success which has already been achieved is indicated by the fact that output per man employed in 1948 was eight per cent higher than before the war—an achievement which compares favourably with that for any other European country.

British Plans for Marketing

It is now generally realized in the United Kingdom that the North American outlook in merchandising is an aggressive one. With this fact in mind, British manufacturers are giving a new and careful examination to packaging, advertising, market research and sales promotion. In view of the high cost of development of the North American market, a liberal allocation of dollar exchange has been promised for sales promotion work. In addition, the British Export Credits Guarantee Department is enlarging its facilities. These will be extended to include partial guarantees against loss by unforeseen circumstances from market research surveys, advertising and stock-carrying activities.

In the field of engineering, energetic steps have been taken as a result of the report of the Engineering Mission to Canada which was headed by Sir Henry Gilpin. Among those steps may be mentioned: improvement in the volume of distribution and the quality of presentation of technical literature, better servicing facilities and supply of spare parts, and, most important, the grouping together of small firms in order to provide joint representation in Canada. The last project is being handled through the trade associations, and it is hoped to have before long a number of skilled specialists located in Canada each representing several firms in a given trade. In other industries regional representation is aimed at.

The United Kingdom Trade Commissioner Service has been expanded, and the staffs increased in the offices at Montreal, Ottawa, Toronto, Winnipeg and Vancouver. In addition, there are Imperial Trade Correspondents (who fulfil the same functions) at Saint John and Halifax. There is a U.K. Information Office in Ottawa.*

Much is hoped for from the trade promotional activities of private business on both sides of the Atlantic. The Dollar Export Board in the United Kingdom and its opposite number in Canada, the Dollar-Sterling Trade Board, have already launched extensive research and sales promotional projects designed to make their respective business communities more aware of the mutual advantages of an expanding flow of trade.

The Outlook

The outlook for British-Canadian trade has certainly been improved by the read-

*The U.K. Information Office publishes fortnightly, in both English and French, "Trade Topics", which tells of the latest British products

justments in the values of the currencies concerned. It has been helped also by the mutual understanding of the problems involved which was shown by the representatives of the United States, Canada and the United Kingdom in recent months and notably at the Washington conference, September 1949.

If Britain and the rest of the Sterling Area cannot increase their exports to North America or earn more dollars through multilateral trading, they will have to continue their present policy of restricting imports from Canada and the United States and of developing alternative sources of supply. If, on the other hand this problem can be solved, the United Kingdom and Sterling Area will be able to buy the food, timber and other materials they need, and Canada will be obtaining from them large quantities of goods now being purchased in the United States. Furthermore, any export surplus to the Sterling Area could be paid for in dollars. As the Rt. Hon. Harold Wilson, President of the Board of Trade said, on his visit to Toronto:

"If we in this year 1949, this year of crisis for Anglo-Canadian trade, face this challenge and thereby pave the way for yet closer relations between our two countries, we shall be making our contribution not only to that higher standard of living for both peoples which we all desire to see, but also to that recovery of the world trading community which is the only guarantee of prosperity, of progress and of peace."

The launching on Clydeside of the "Rangitane", a 19,000 ton passenger-cargo liner.

Papain Production in East Africa

British Official photographs

Papain is a digestive enzyme, resembling animal pepsin, that is contained in the milky juice of the papaya or papaw tree (*Carica papaya*). In the last few years the papain industry has developed very rapidly in East Africa and it is now a small but flourishing export trade.

On most East African estates, cultivation is done mechanically. The picture above shows a tractor hauling a five-and-a-half-foot disk harrow between rows of papayas. Right: Fruit being tapped.

The papaya is a native of tropical America but it is now cultivated in most tropical countries. The melon-like, yellowish fruit, which grow in clusters below the crown of leaves, are a table delicacy. In the preparation of papain the skin of the fruit is lightly scored and the latex allowed to drip into collecting trays which are attached to the trunk of the tree. In the picture above, the large fruit is much scarred from previous tapping and is almost ready for pruning off.

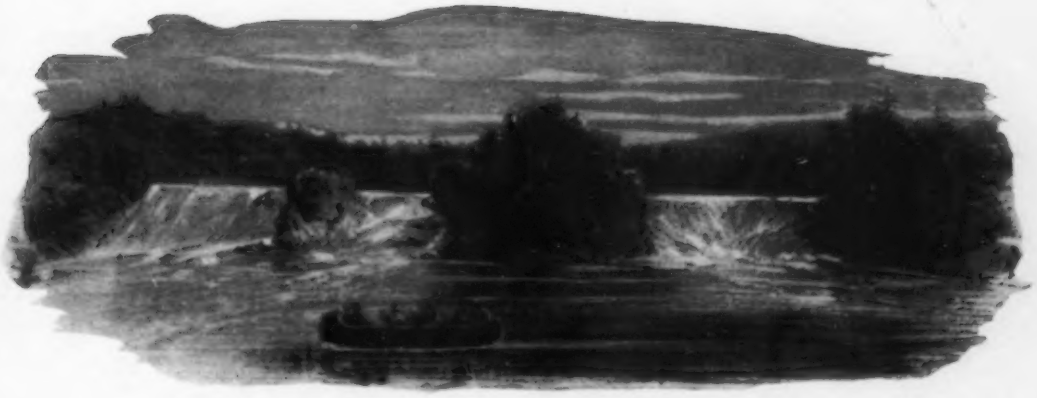
Papayas normally bear male and female blossoms on separate trees. At the left is a young male plant. The accepted ratio necessary for cross pollination is one male to fifty female plants, the minimum amount of space being given to the non-productive male trees.

Below:—The cleaned papain is placed on cloth-covered wire trays and spread out thinly, ready for drying in the kiln. To avoid pasting the papain on the cloth a wooden fork is used for the spreading operation.

The papain is dried in a kiln (top right) after which it is packed in boxes for shipment. It has many uses, both industrial

and medicinal. Industrially it is used as an ingredient in many baby foods, for making meat tender, as a silk softener, for making nides supple, as a beer clarifier, and in analysis work. Medicinally it is useful in chronic dyspepsia and gastric fermentation cases as well as in the treatment of many diseases.

The East African papain industry is centred around Arusha on the slopes of Mount Meru and Moshi on the slopes of Kilimanjaro in the northern province of Tanganyika. The picture below shows Kilimanjaro as seen from near Moshi, but there are no papayas in the photograph.



A River in Harness

by B. J. McGUIRE

ALMOST a thousand years ago, a Viking King of England stood on the sea-shore and ordered the incoming tide to recede. The tide ignored Canute's command; complete master of the people of England, Denmark and Norway, he was helpless against the forces of nature.

In the light of his experience, the Viking King today would be startled by what has been done by Canadian engineers in the last half-century. In effect, they stood on the shores of the turbulent, Laurentian-born St. Maurice and commanded that river to change its centuries-old customs; that it end its life of leisure and go to work; that it modify its habit of flooding in the short wet seasons of spring and autumn, and falling in the long dry periods of summer and winter.

This was no simple task which the engineers set themselves. For centuries the St. Maurice was the "bad boy" of New World rivers. The fur traders who used this water route to the hinterland after the first trading post was established at Trois Rivières in 1610 found it frighteningly dangerous. With four major falls between La Tuque and Trois Rivières, the menace of the river to their lives and supplies was as serious and sudden as the violent attacks of the marauding Iroquois. The difficulties of travel on the river were so severe that, as soon as a post was established at Montreal, the traders pointed their canoes in that direction and Trois Rivières began to languish. It was this river, a torrent dubbed "a great catastrophe" by an early writer, that the engineers undertook to harness. But—unlike the old Viking—they had at their disposal the knowledge, equipment and vision which enabled them to enforce their demands. Equally important, they were supported by men of vision who could and did risk the money necessary to carry out the plan.

How much the history of the world might have changed if the tides had obeyed Canute's orders can never be known; how much the history of a region can change when a river is usefully controlled is something which can now be measured accurately. For the St. Maurice, in the heart of the Province of Quebec, offers the world an outstanding example of a river that has been tamed, regulated, controlled, harnessed and made to produce electricity for people far beyond its own valley.

Water itself contains no electric power or energy. The only "power" it possesses is the driving force to turn the generators which produce the electricity. This force reaches its greatest concentration when water falls from a great height, where its weight and velocity can build up tremendous pressure.

Left:—One of the falls in the upper St. Maurice River, Rapide du Lièvre, where a hydro-electric power plant will be built at some time in the future.

A spare turbine runner in a St. Maurice River powerhouse. The blades of this runner are over 9 feet long and the runner, at the base, is more than 12 feet in diameter.

The actual work of the St. Maurice water is simple. Like the horse on the old-fashioned treadmill, it makes the wheels go round. To do this, it rushes down through man-made penstocks or tunnels, strikes the curved blades of man-made paddle wheels, carries the blades forward by the sheer momentum of its velocity and weight, and then with its energy spent, it escapes through the tailrace to the river. The constant pressure of the water, as it strikes the wheels and passes on, causes these wheels to spin steadily; in spinning they turn the machines which generate the electrical energy that is so useful and valuable in homes and industry.

This, of course, is not the first time that man has attempted to harness natural forces to help him with his work. Since the ancient days when he first learned that he must work for a living, man has never ceased thinking of and striving for easier and more satisfactory means of doing his work. He invented tools, weapons and implements. He tamed and trained animals to carry his burden. He built machines that would do the work of many men. But with all his inventive genius, he has never been able to build a machine that would run itself; it has always had to be supplied with energy from some source.

In the struggle for food, shelter, warmth and comfort, man has often looked for help and received it from rivers and streams. The songs, verses and legends of our own and many other countries give much attention to rivers, waterfalls and old mills. Except on the prairies, almost every village and hamlet in Canada had its "old mill", usually built beside a waterfall, and more than one of our great cities began life as a small settlement in a remote area where mills could be erected. The "Old Mill Streams" of Canada served the millers well. They provided the water power for the great wheels which ground the grain, to supplement the supply of food for a growing population.

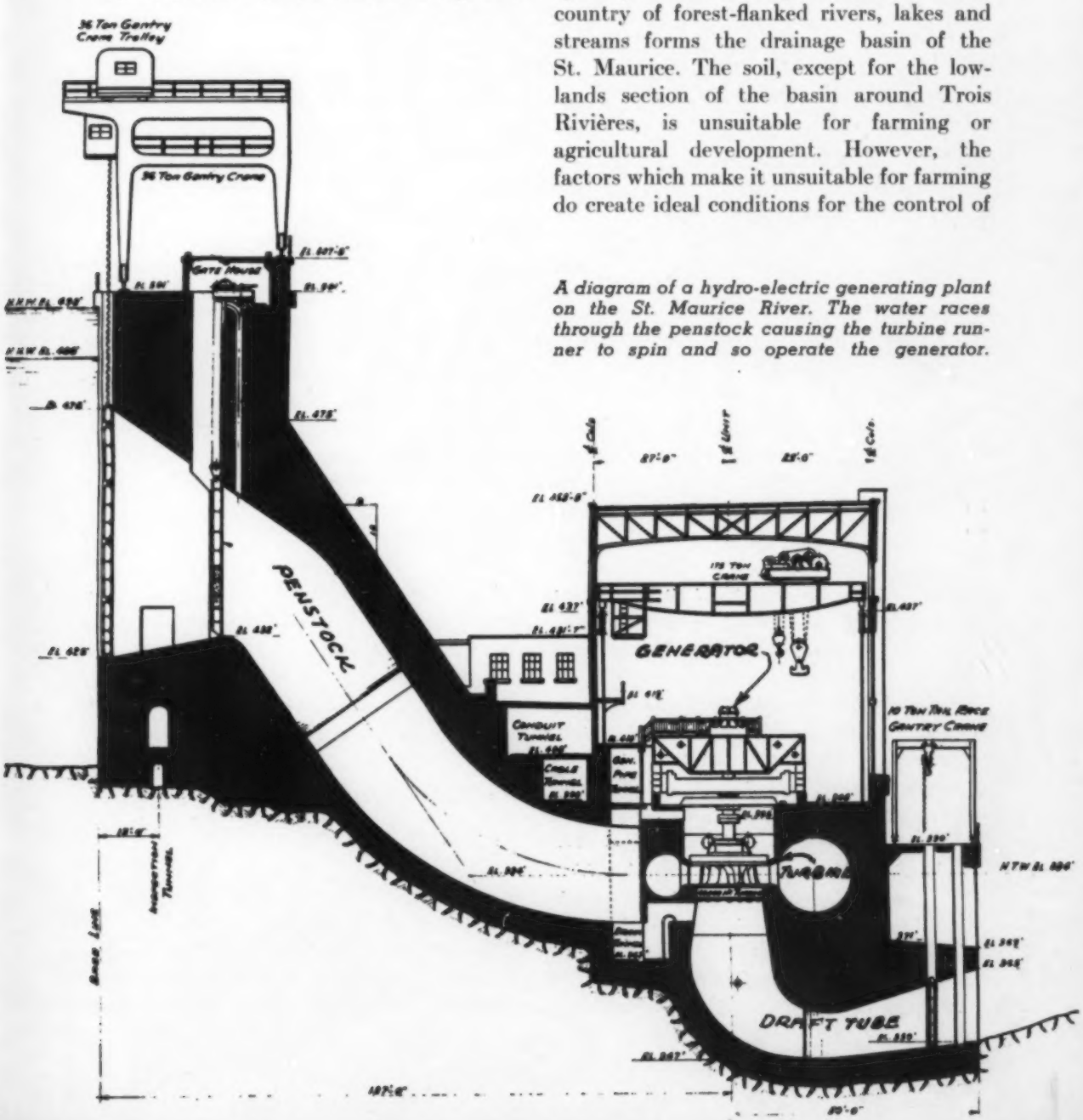
More than two centuries ago, it was learned that electricity was another of the many forms of energy, and men began seeking a means of putting this energy to work. It was not, however, until they turned again to their old ally, the river, that they began to derive a new efficiency from water power. Under proper conditions and with the right equipment, large quantities of electricity can be produced on suitable rivers. Electricity does the work of millions of men; it lights our homes, our streets and our offices; it runs our radio, our washing machine, and our toaster; it does thousands of jobs—and does them well—but its most important task is running the machines of farms and factories that provide so many jobs and produce so many things that have advanced our standards of living.

Power sites are not rare. Most countries of the world are favoured with the natural resources for producing power. What is relatively rare, however, is the meeting at the proper time and place of the three basic elements required for a successful venture

in hydro-electric development. These three elements are:—a regulated flow of water in volume on a manageable slope; engineering skill to harness the available water power; and enough money and courage to pay the expenses which can be staggeringly large.

The St. Maurice, an outstanding example of a power-producing river, is not unusually large or long. Its length from its head waters in the wooded Laurentian highlands to Trois Rivières where it flows into the St. Lawrence, 80 miles east of Montreal, is only 240 miles. The 20,000 cubic feet of regulated water which on the average it empties into the St. Lawrence every second is much less than the 220,000 cubic feet which roars over Niagara Falls in the same period. The St. Maurice is unusual, however, in that it falls a total of 1,300 feet during its 240-mile course. It is this fall—an accident of geology and climate—which has been harnessed and put to work.

The St. Maurice River drains a large oval-shaped area of 16,000 square miles. Most of it is in the Laurentian Mountains. This sparsely settled, heavily wooded and rocky country of forest-flanked rivers, lakes and streams forms the drainage basin of the St. Maurice. The soil, except for the lowlands section of the basin around Trois Rivières, is unsuitable for farming or agricultural development. However, the factors which make it unsuitable for farming do create ideal conditions for the control of



A diagram of a hydro-electric generating plant on the St. Maurice River. The water races through the penstock causing the turbine runner to spin and so operate the generator.

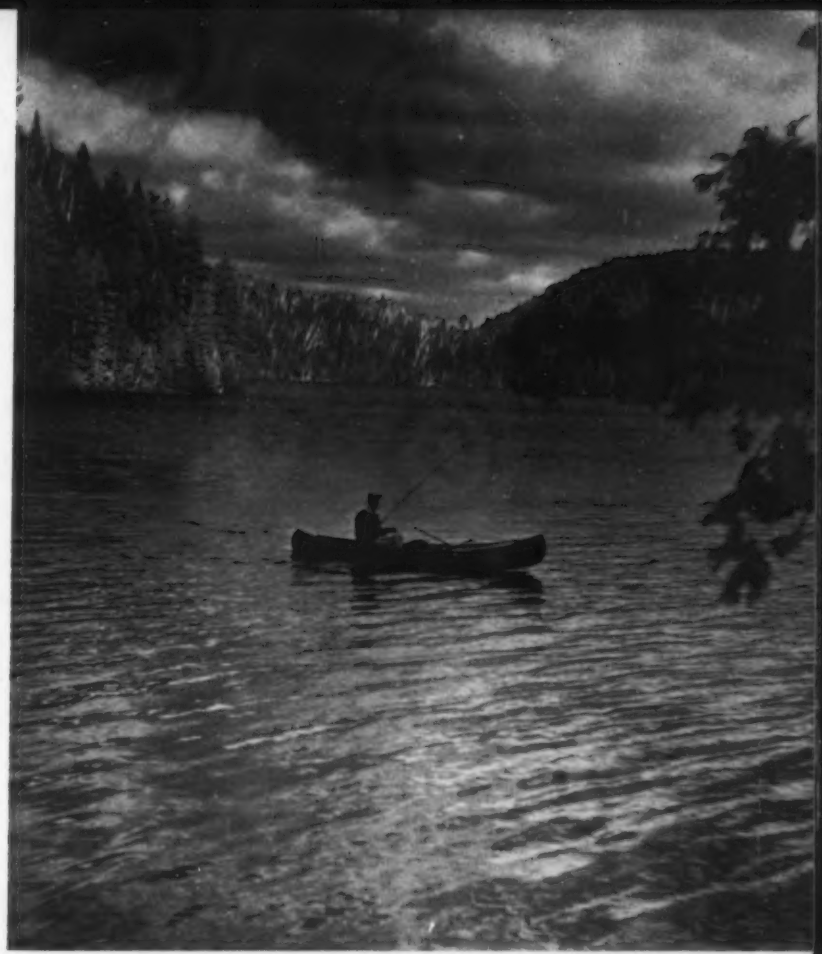
Upstream from La Tuque, the St. Maurice River passes for some 30 miles through a deep, narrow valley. Note the railway running along the bank.

run-off from rainfall and snow and the development of hydro-electric power.

This forested and mountainous drainage basin has an annual average of 28 to 30 inches rainfall and 95 to 110 inches snowfall. Its relatively heavy precipitation is one of the secrets of the river's success as a power producer, for the converging run-off gives the St. Maurice the volume of water needed to turn the generators. However, the rainfall is seasonal, varying from month to month and year to year. Further, the amount of snow that falls and accumulates throughout the winter to be released by the spring thaws in torrential rushes of water also varies from year to year.

The amount of precipitation makes the power industry possible—but the variation causes perplexing difficulties. At any specific time and place the run-off may be too high or too low, as this example will show. Once, at the height of the flood season, these variations caused the river to become a raging, foam-lashed torrent, with 175,000 cubic feet of water hurtling over the falls at Shawinigan every second; in the dry season the flow of the river remained fast, but the volume fell below 6,000 cubic feet a second—a 3,000 per cent variation from season to season. Were it not for the natural retarding effect of the heavy woods and thousands of lakes in the

The St. Maurice valley is known throughout the continent as the sportsman's paradise. A fisherman in his canoe on one of the many thousands of lakes in the valley.



The St. Maurice between Grand'Mère and La Tuque. Wide stretches of forest land with settlements along the river bank.

drainage area, the variation in run-off would be even greater.

The unregulated flow of a river usually presents a serious problem to anyone with the temerity to plan, finance and develop a power-producing project. Powerhouses, and the transmission systems required for the distribution of power, cost a great deal of money. The larger the project, the more it costs.

An organization spending the huge sums of money required for a large power-producing enterprise must face certain economic realities which may be defined roughly as "making ends meet". These realities are the same for the farm in the dell, the grocery store on the corner or the factory at the end of the street. Every type of business, whether it employs one person or many, whether it is owned by one person or many, must earn enough during the year to pay the inevitable bills for such things as light, heat, rent, interest, wages, taxes, supplies and equipment. The farmer and the grocer know they are more likely to meet expenses and prosper by working full time than by working part time. Similarly the factory must work efficiently and steadily to meet its large expenses, many of which go on whether it is working or not.

The power projects on the St. Maurice faced these economic realities. Large amounts of money were required to build the dams and the power stations as well as to pay for the machinery and equipment needed. This money could be raised only from people willing to invest savings in the hope that the

The power development at Rapide Blanc, 135 miles upstream from Trois Rivières. The model village housing the staff and their families is in the foreground. This development, 10 miles from the nearest railway station, was completed in 1934.

investment was sound and might eventually be profitable. Obviously, if the equipment were used only part of the time, the investment would hardly be profitable. It was necessary therefore—in order to avoid operating at a loss and eventually going bankrupt —to plan a project which could operate at or near capacity most of the time. Only by producing electricity steadily—and by having an immediate market for it—could the enterprise earn enough money to meet expenses and make the investment worth while.

A river violently fluctuating in volume does not naturally lend itself to a power development — a regular year-round flow of considerable volume many times greater than is normally available in the dry seasons is usually required.

Unable to alter climatic conditions, the engineers try to conserve at least a portion of the water which escapes out of the drainage area at flood time. In the St. Maurice project they took a leaf from the book of the Canadian beaver. This industrious and alert animal solves its water problem by building dams to form a pond, thus assuring itself of all the water needed for home protection and water runways. So the engineers, working with the Quebec Streams Commission, which supervises all running waters in the province, built dams on the headwaters and tributaries of the St. Maurice. Behind the dams great reservoirs of water are accumulated by the spring thaws and autumn rains. This water can then be drained off into the river as required to maintain the steady flow at the stations and to enable power houses to service homes and industries all the year round.

The similarity between the beaver and man-made dams is one of principle and not of size. Beaver dams are small; the dams in the drainage area of the St. Maurice are of tremendous size, impounding huge man-made lakes of water. The first of these was established in 1908 at the outlet of Kempt Lake on the Manouan River, one of the largest tributaries of the St. Maurice. Two years later a second and then a third dam were established at lower points on the same river. Together these storage areas can hold 20.5 billion cubic feet of water.

These large reservoirs are now dwarfed by two other projects, one located at the headwaters of the St. Maurice itself and the other on the Mattawin River which joins the St. Maurice sixty miles north of the St. Lawrence. The first of these, the Gouin Dam, impounds a total of 220 billion cubic feet of water at spillway levels, forming an artificial lake of 500 square miles with an average depth of 17 feet. With flashboards added the dam is capable of holding an additional 60 billion cubic feet. The Mattawin reservoir, covering an area of 65 square miles, has a storage capacity of 33 billion cubic feet, giving to the St. Maurice a total reservoir capacity of 330 billion cubic feet.

These great reservoirs, together with the smaller ones on tributary streams, store enough reserve water to provide a dependable flow of about 20,000 cubic feet per second at Shawinigan Falls. This arrangement has overcome most of the natural difficulties arising from wet and dry seasons, regulating the flow of the river so that at all seasons of the year — not only during the spring floods and autumn rains, but at all times — a large and constant flow of water is available to turn the generators. More spectacularly, by providing reservoirs which

Gouin Dam at the headwaters of the St. Maurice River. Completed in 1918, this dam creates an artificial lake with an area of 500 square miles which impounds up to 280 billion cubic feet of water. The reservoir of water can be drawn upon throughout the periods of low river flow to maintain high output from the power stations.

Shawinigan Falls during a spring flood. For most of the year the falls are dry; the whole flow of the river is diverted through the powerhouses.

The junction of the Manouan River with the St. Maurice at Sanmaur. The settlement is seen on the left bank of the river.

make it possible to regulate the flow, these man-made dams have trebled the capacity of the river to produce a sustained flow of power and have immeasurably increased its natural ability to serve the country.

The construction of the dams, miles from the railways, was a gigantic task in itself but the difficulties were multiplied by the fact that, before construction could even begin, thousands of tons of materials and supplies had to be moved through a wilderness where no roads existed.

An interesting feature of the power development on the St. Maurice is the manner in which the natural fall of the river has been utilized. The total descent of 1,300 feet, represented largely by a series of falls, cascades and rapids, often separated by many miles, led to the planning of ten power houses at different locations on the river, each in a position where it could use part of the fall. Five of these have already been built — one at La Gabelle, fourteen miles north of the St. Lawrence; another at Shawinigan Falls, seven miles farther up; the third at Grand'Mère, ten miles above Shawinigan at the gateway to the pulp wood stands of the upper river; the fourth at La Tuque, 104 miles north of the St. Lawrence, and the fifth at Rapide Blanc, thirty-two miles farther upstream. While this arrangement of power houses makes it possible to use and

La Gabelle development on the St. Maurice River, 12 miles from its junction with the St. Lawrence at Trois Rivières.

Top left:—The city of Grand'Mère with its pulp mill and power project, is the gateway to the forest lands of the St. Maurice.

Bottom left:—The city of Shawinigan Falls surrounded by farm land. Carved from the wilderness of the forest in just over half a century, this city, with its power developments, factories, homes and all that goes to make up a prosperous community, is an excellent example of the product of man's ingenuity and nature's bounty.

re-use the water a total of five times, its deeper significance lies in the fact that it permits the greatest possible use of the water fall. Dwarfed by their mountainous surroundings, yet massive, towering structures of steel and concrete, these five plants have a total installed capacity of 1,285,400 horsepower, with plans made for an additional 109,500 horsepower.

The nerve centre of this great system is located at Shawinigan Falls. The control room in this city is in constant contact by telephone or radio with dams, powerhouses, stations and offices throughout the entire producing and distribution area. From here is sent the information which controls the amount of water to be released from the dams and the amount of power to be made by the generators, as well as the points to which this power will be sent. This control room, in which skilful operators with instruments, phones and radio command over 1¼ million horsepower, is strikingly symbolic of the age of electricity.

Shawinigan Falls, the focal point of the vast St. Maurice Valley electrical system, also has an historical position as the birthplace of many important innovations in the electrical field. Here was pioneered the first hydro-electrical power project on the St.

Windigo, an important lumbering depot on the St. Maurice at the head of the 30 mile lake created by the Rapide Blanc dam.

Maurice. No highways or railway led to Shawinigan Falls when the Company first investigated the site in 1898, and the now thriving community of 36,000 then had a population of one man. When the first two 5,000 horsepower units were installed in 1903, they were then as large as any ever manufactured; the eighty-five mile, 50,000 volt transmission line linking Shawinigan with Montreal was, in 1903, the longest and highest-voltage transmission line on the continent. At Shawinigan, where a capacity

La Tuque power development and Brown Corporation's pulp mill with part of the town of La Tuque. In the background the mouth of the Bostonnais River can be seen.

of 10,000 horsepower once startled the world, there is now an installed capacity of 489,900 horsepower. More than 10,000 miles of transmission and distribution lines now carry power for the system.

From this growth can be read the history of half a century of industrial development which has few equals in practical achievement anywhere in the world. Recognized as a cradle of the industry in Canada and the laboratory in which successive phases of the industry were developed, Shawinigan is visited yearly by engineers and scientists from all parts of the world seeking information.

Impressive though this record is, it does not exhaust the potentialities of the river. Already under construction or on the drawing boards in the engineering department are plans for an equal number of new power installations to be developed for the future. The first of these is scheduled for completion at the Trenche site, 130 miles above Trois Rivières, in 1951.

This project, which is costing over $35,000,000, including the necessary new transmission lines, was begun late in the spring of 1948, and is scheduled for completion in 1951. The first job, to link the site by road to the nearest railway point, 12 miles away, was accomplished before the end of the year. A seven-mile long, beautifully-graded private highway, built through rocky hills and swamp, now connects the site with the existing company road from the Rapide Blanc development, and with the railway. Loads of more than one hundred tons are now being transported over that route through the bush, and construction of the power-plant itself is well ahead of the original schedule. As many as 2,000 workers are employed on the job. They are housed in a temporary town which boasts not merely living quarters and workshops but numbered streets, electric heating, hospital, school and churches, fire and police services, stores, recreational facilities, and a community hall.

Upon completion of all proposed power-producing plants on the St. Maurice, a roll call will read like this:

Site	*Distance above Trois Rivières*	*Head Used*	*H.P. Capacity*
Rapide Allard	183	87	132,000
Rapide du Lièvre	177	83	124,000
Rapide des Coeurs	164	70	112,000
*Rapide Blanc	136	112	240,000
Trenche	129	160	396,000
Rapide Sans Nom	113	110	252,000
*La Tuque	104	114	267,000
*Grand'Mère	31	80	226,000
*Shawinigan Falls	21	145	489,900
*La Gabelle	15	60	172,000
Total		1021	2,404,900

(*Plants now operating).

When the complete power plan of the river is eventually effected, the ten stations will be utilizing a total water fall of more than 1,000 feet and will have a producing capacity of over 2,400,000 horse power. It is difficult to envisage a better example of wasting assets being harnessed to near-

Early days at Shawinigan Falls. The first 10,000 horsepower plant of the Shawinigan Water and Power Company at Shawinigan Falls, in 1903. A total of 489,900 horsepower is now taken from the river here.

The settlements of St. Jacques des Piles and St. Jean des Piles on either side of the St. Maurice, 10 miles upstream from Grand'Mère. Large quantities of logs are seen floating down the river. This is one of the most beautiful stretches of the entire St. Maurice River.

capacity and their energies being diverted to the service of people not only in the immediate vicinity but also far removed from the area. The man-power, energy, materials and money required to complete this vast project add up to staggering totals.

While the conquest of the river has been conducted largely to produce electrical energy, it has been necessary at all times to make provision for the older pulp and paper industry which uses the waters of the St. Maurice as a highway for driving ten to eighteen million logs from the woods to the mills every spring and summer. At each power house and dam, provision has been made to keep the logs moving with the current. Since they must go over the dam, guide booms are built on the river immediately above the dams and the logs are directed by the current into these guides which lead to sorting gaps and flumes. From here they move to log chutes which enable them to pass over the dams. In the construction of these devices care must be taken to avoid unnecessary waste of water, while provision must also be made to keep the logs moving, irrespective of the water level.

Certain problems are encountered also on those stretches of the river and its tributaries where water is backed up, either for storage purpose or for additional head for the generators. In these areas, the river loses much of its current, and in addition to side or glance booms to keep the logs out of currentless backwaters, artificial means are often required to keep them

One of the largest newsprint mills in the world situated at the junction of the St. Maurice River and the St. Lawrence at Trois Rivières. Part of the city is shown in the foreground and the city of Cap de la Madeleine is in the background.

moving. Where necessary they are formed into huge rafts—from 100,000 to 125,000 logs to a raft—and towed by specially designed boats to a point in the river where they can be moved by the current.

What has been the effect of this river control on the area and on Canada? Both the province and the nation have been enriched as a result of this development. One immediate benefit is Canada's position in the forefront of the industrial countries of the world. The United States, for example, with a population of 150,000,000, has a total of 73,000,000 horsepower, of which 52,000,000 is produced by the more expensive steam process. Canada, with a population of 13,200,000, has a total of 12,549,000 horse power, of which only half a million is made from steam, giving the Dominion approximately seven times as much water power per capita as the U.S.A. Quebec alone has an installed capacity of 5,500,000 horsepower—with 65 per cent of its total yet to be developed. The growth of its hydro-electrical industry has played an important role in Canada's rapid rise to an eminent position among the great manufacturing and trading countries of the world.

Electrification has had far-reaching effects throughout the country and has been spectacularly impressive in the region of the St. Maurice. Industries are attracted to the areas where low-cost power is available and it is significant that the pioneer power establishment at Shawinigan Falls less than half a century ago immediately attracted

Aluminum smelter and wire mill at Shawinigan Falls where the first aluminum ingots were cast on October 20, 1901. The aluminum industry of Canada first began here.

four industries. One was aluminum, then a newcomer in the world of commercial metals, but dependent then as now on low-cost power which is used in large quantities in the production process. Aluminum was the first industrial customer for hydraulic power at Shawinigan. A small enterprise half a century ago, it was nourished here to grow into one of Canada's greatest industries. Major aluminum-producing units are now located in Arvida on the Saguenay River, but the original half-century-old plant still stands and operates at Shawinigan Falls.

Another immediate result of the installation of power-producing facilities at Shawinigan Falls was the erection of a calcium carbide plant. From this beginning has grown one of the great chemical industries, not only of Canada, but of the Commonwealth of Nations. Electricity led to the establishment of pulp and paper mills at Shawinigan Falls, stimulated the industry in the region, and paved the way for Trois Rivières to become the greatest paper-making centre in the world. A cotton mill was erected in Shawinigan Falls soon after electricity became available — and today 70 per cent of Canada's textile products come from Quebec.

Such pioneers were immediately followed by other enterprises which were also made possible by low-cost power. Not only in the immediate vicinity has this evolution occurred, but there have been corresponding developments everywhere within reach of the marching towers which carry the energy

Top to bottom:—The huge steel towers of the power transmission lines stretching mile after mile through the countryside are familiar landmarks in the St. Maurice valley.

A typical farm scene in the St. Maurice valley near Trois Rivières.

A business street in the city of Shawinigan Falls.

from the generators on the river. More than 70 per cent of the population of the province —including the city of Montreal—has been affected by this venturesome and brilliantly executed operation of controlling and harnessing the river. Five important industrial centres—La Tuque, Grand'Mère, Shawinigan Falls, Trois Rivières and Sorel—have been created as a direct result of these efforts.

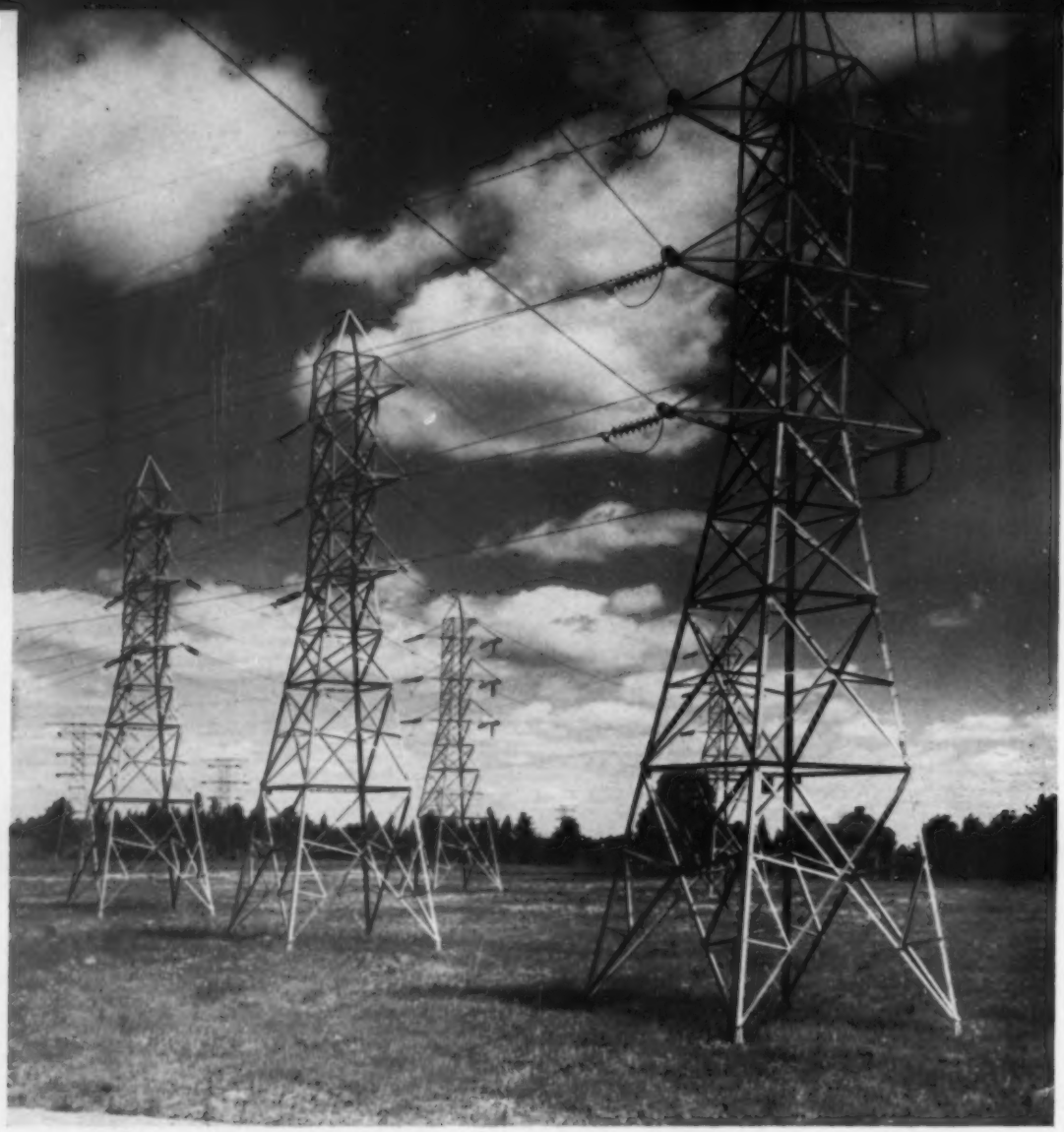
Indicative of the evolution which has occurred in the last half-century is the fact that in 1900, about 60 per cent of the population of the Province of Quebec lived in rural districts. Today less than 35 per cent live in country districts and the rest live in growing urban areas where amenities of modern living are available to all. In 1900 the value of the agricultural production of the province was greater than the industrial production. Today the value of the province's industrial output has risen to more than $3,000,000,000, while the value of farm products although increased in the past fifty years now represents 13 per cent of Quebec's total. The number of industrial jobs in the area has increased 800 per cent since the beginning of the century. Correspondingly, the value of the industrial production is sixty times what it was then.

The St. Maurice River, now effectively controlled, is the backbone of the power resources of The Shawinigan Water and Power Company and ranks as one of the largest enterprises of this kind on the continent. Over its 10,000 mile network of transmission and distribution lines flows the power to run the motors and service the homes of citizens in more than 550 municipalities throughout an area of 16,000 square miles. More than 175,000 customers are now served by this system—but almost 90 per cent of the total power output is used by industries.

Such is the contribution to Canada of a river which, more than once in its storied past, defeated the bright prospects of the valley by the very violence of its nature. When the Indians and hardy *coureurs de bois* chose the Gatineau-Ottawa River route rather than face the hazards of travel on the St. Maurice, the district's flourishing fur trade rapidly declined.

Foreshadowing the region's industrial importance in a later age was the early development of an iron-making industry based on the bog iron found on the banks of the river. A significant item in the cross-currents of history, this industry lasted 150 years before its final collapse in 1883. For many years the river defeated all efforts to use its waters for carrying logs, but it was finally mastered for this purpose about a century ago. In spite of the stimulation provided by the lumber trade, the economy of the St. Maurice Valley was contracting, and Trois Rivières, an excellent barometer of the progress of the region, was declining, when the first power project was launched at the turn of the century. The citizen who had accepted as truth the statement "After the wood the St. Maurice has nothing" can be pardoned for underestimating the importance of the power development which began at Shawinigan Falls half a century ago. The new project launched not only a new industry at Shawinigan, but a new way of life which extended its benefits beyond the valley to all Canada in a manner which outstripped the dreams of the men who created the enterprise.

An early forge working local bog iron found on the banks of the St. Maurice River.



A common scene in the St. Maurice valley. Transmission lines which carry the life-giving power from the St. Maurice to turn the wheels of industry and light the homes, farms and cities far beyond the St. Maurice valley.

Harnessing the river was only part of the task. The distribution of the power generated on the river represented an enterprise which made equal demands on the energies, resourcefulness, technical knowledge and finances of the builders. The huge steel towers which carry the high-voltage transmission lines had to be designed, built and erected. The conductor-cable — most of which, incidentally, comes from the aluminum plant at Shawinigan Falls which was the Company's first customer—had to be strung on the towers. Spanning the wide St. Lawrence and leading power to the growing communities on the South Shore was also an engineering feat which attracted world-wide attention. The sub-stations, switching points and tremendous service organizations required to maintain the flow of electricity to the homes, businesses and cities of the area all made demands on the Company and returned rewards to the area in terms of more jobs, more opportunities, more local wealth. But all are possible only because the St. Maurice is no longer the wild, irrepressible body of cascading water which the old-time trappers and travellers feared, but has become disciplined and responsive to the command of the engineer.

Rapide Allard just below the junction of the Manouan and St. Maurice Rivers. The railway is shown on the right. This site has been chosen for future development.

Part of the harvest gathered each year from the forests of the St. Maurice valley. The photograph shows the wood pile at the paper mill in Grand'Mère and many hundreds of thousands of logs floating in the river.

Dec 21st 1944

John Clarence Webster

by ROBERT J. C. STEAD

THE DEATH of Dr. John Clarence Webster at Shediac, New Brunswick, on March 16th of this year removes from the Canadian scene not only a citizen of great and versatile ability but one of the most distinguished researchers into Canada's historic past. As a member for many years of the Historic Sites and Monuments Board of Canada, and latterly Chairman of that board, he played a large part in shaping the policies and decisions relating to the marking and preservation of historic sites in this country, and he was actively concerned with a number of projects which have been the occasion of articles in this Journal. In July, 1929, Dr. Webster was elected to the first Board of Directors of The Canadian Geographical Society following its incorporation. In 1938 he became a member of the Editorial Committee also, and in both capacities he gave his services helpfully and generously to the Society until the time of his death.

John Clarence Webster was born in Shediac, New Brunswick, on October 21, 1863. He received his early education at Shediac and matriculated at Mount Allison in September, 1878. Although a brilliant student, as his career was later to demonstrate, he had little patience with the study of Greek and Latin. "If I had given to modern languages," he said, "the time which I wasted on Latin and Greek, I would have been more benefited." His principal interest was in social sciences, literature, history, and mathematics on the lower plane. On the whole his college performances were not too satisfactory, but he graduated in 1882 and spent that summer in Shediac.

He had already decided the course his career should take. Although offered a position in a law office he was determined to pursue medicine, and for that purpose he went to Edinburgh in 1883. There he found himself in an atmosphere very different from that in which he had lived in a small country college. The University was steeped in tradition, and his teachers were masters of their subjects with world-wide reputations. In 1884 there were 2,400 students in the Medical Department of the University. Amid this galaxy of talent and ambition the slender Canadian from Shediac felt very much alone. In 1887 illness compelled him to go home, and it seemed doubtful whether he would ever be able to resume his studies. Indeed, it is remarkable how this man, who lived to be 86 years of age and who to the day of his death was a veritable human dynamo, was at least twice obliged to change the whole course of his career out of consideration for his health. However, in this case he was able to return to Edinburgh where he graduated as Bachelor of Medicine and Master in Surgery in 1888.

Life in Edinburgh

Edinburgh fascinated the young doctor, and he was quite determined to make it the scene of his life's activities. In 1890 he obtained his M.D. degree from the University, and was also awarded the gold medal for his thesis. The College also did him the honour of publishing his thesis in two large volumes at a cost of more than £1,000 and presenting copies to institutions in various parts of the world. Dr. Webster was beginning to feel that he had arrived. He took no part in sports or athletics, and very rarely went to the theatre, because he felt that he could not spare the time, but his penchant for research into things historic was beginning to assert itself, and he found in Edinburgh a never-failing mine of interest. He won a number of scholarships and spent his spare time in the study of Scottish history. Later he developed an interest in music and

painting, which was whetted by occasional visits to the Continent.

Dr. Webster began to find growing within him a great affection for Edinburgh. Writing many years later he said: "Although I have been many years from Edinburgh I have always had the feeling that it was my real spiritual home . . . One characteristic pervaded all classes; money could not purchase an entrance into the best society, nor the want of it debar one . . . Edinburgh as a city had no compeer in the British Isles . . . I had fully determined to make my home in Edinburgh."

But the demands of his health compelled him to abandon that intention. He had established himself, and his work was recognized in the leading Universities of Europe and America, but a severe bronchial attack in 1896 caused his medical advisers to tell him that if he wished to escape tuberculosis he should seek a drier climate. It was this alternative which forced him, with great regret, to return to Shediac.

In Canada and the United States

He was not long in Canada before he was offered the position of Assistant Gynaecologist to the Royal Victoria Hospital in Montreal. In 1898 he contracted blood poisoning from a patient, which resulted in a serious illness. The following spring he was offered the position of Professor of Obstetrics and Gynaecology in Rush Medical College, Chicago. He was married that spring, and after his marriage resigned his appointments in Montreal and moved to Chicago. In Chicago he developed a very large operational practice in addition to his professorial duties. He became a citizen of the United States, but at the outbreak of the war in 1914 he offered his services to the Canadian medical authorities at Ottawa. The offer was declined on account of his age and his American citizenship. Two years later he was seized with a serious infection, and from then on found physical difficulty in carrying his heavy load of practice and responsibility. In 1920 he resigned his Chicago connections and returned to his old home at Shediac.

Webster the Historian

Dr. Webster was now in his fifty-seventh year, he had acquired a comfortable competence, his health was not good, and he had surely reached a condition in which most men would allot themselves a life of ease and retirement. Not so Dr. John Clarence Webster. As time was to show, those achievements for which he will be remembered longest were still before him. It was no hardship for him to go to Shediac. He confesses that he longed for the country after so many years in the cities. There was no doubt also some nostalgic urge, not only for his native town but for his native land, which led him to take prompt action to re-acquire Canadian citizenship. His interest in history had been excited in Edinburgh, and he now planned to pursue that subject, with special reference to the Canadian background. He became a collector of Canadian books, documents, and pictures, and in the pursuit of these interests he travelled widely in England and France. He delved deeply into the Public Archives of Canada and also made research into their historic material in eastern Canada and eastern United States. He made special study of the life and background of General Wolfe and was made a member of the committee of management which was charged with the responsibility of maintaining Wolfe's birthplace as a permanent memorial.

What was perhaps Dr. Webster's most important appointment, and the one which gave him most enjoyment because of its association with the history of Canada, came in 1923 when he was made a member of the Historic Sites and Monuments Board. This is an honorary body comprised of historians of recognized standing which advises the Canadian Government concerning the marking of historic sites and the establishment of national historic parks. After serving as a member of this Board for twenty years he was made Chairman of it, and continued to hold that position until the time of his death. He was closely associated with the establishment of historic museums at Louisburg and Beauséjour, but his interest extended to many other historic sites and museums in

the Maritime Provinces, including the important New Brunswick Museum in Saint John, N.B., to which he gave a large part of his collections.

His greatest love was, however, the museum at Fort Beauséjour.* It is largely due to his influence that this historic fort has been preserved as a national park, and it is not remarkable that when an historical museum was established there in 1935 he was appointed honorary curator. Such was his enthusiasm for locating historic relics relating to the fort, and his generosity in making presentations, often at his own expense, that the museum almost immediately became over-crowded. An addition was opened in 1939, but even this did not long prove sufficient, and another wing had to be built, which was opened with impressive official ceremonies on August 2, 1949. In honour of the man who had done so much for Canadian historical research in the Maritimes, and particularly for Fort Beauséjour, the new section of the museum bears a tablet with the inscription, "The John Clarence Webster Wing". In addition to his many gifts to the museum itself Dr. Webster presented to the Crown about twenty acres of land of great historic value to round out the park property, and on another occasion presented to the Crown the old French dry dock at Lower Jolicure. The great interest and ambition of his later life seemed to be to create an interest in Canadian history and an appreciation of its not inglorious background which would be a powerful influence in shaping the Canadian character of today, and of continually growing importance as the years go by.

Dr. Webster was a slim man, somewhat undersized, possessed of much personal charm but none too robust health. But within his tight-knit frame he embodied an energy that was almost cyclonic. The vigour with which he attacked every phase of life as it developed before him was equalled only by the breadth of his interests and the catholicity of his tastes. The artist and the musician, as well as the historian and the surgeon, found expression in him. For example, as a result of his researches into the life of General Wolfe, he published a very scholarly and beautiful book about the soldier who shaped the course of the American Continent perhaps more than any other, but his book has almost nothing to say about military matters. Instead, it reproduces and discusses some thirty paintings, drawings, and caricatures relating to Wolfe and his immediate circle. In his busy life he found time to write no less than 12 books and 98 papers of a medical and scientific nature, but even more surprising is his production of fifty different literary and historical publications, some of them involving a great amount of research. He was the recipient of honours from many sources, which, while no doubt gratifying to him, made great demands upon his time as a public speaker and in attendance at public events. It would be difficult to imagine a life more active than was his.

His life was not without its sorrows. On August 10th, 1931, his son John crashed while flying near Montreal, and died a few hours later. Even more tragic was the death of his daughter Janet. A gifted and highly educated young woman, she was studying art in France when she met Camille Roche, a painter and music-lover. They were married, and, as the Doctor says, Janet "slipped easily into the world of arts and letters to which her husband belonged". By the fortunes of war Janet found herself in a German concentration camp, where she died of malnutrition, which is a nicer word than starvation. These blows were accepted by Dr. Webster, if not with equanimity, at least with fortitude. Nothing could for long deflect him from his life's purpose, which can be best quoted in his own words: "May I always be remembered as one who, though conscious of many shortcomings, ever strove to follow the Biblical injunction, 'Whatsoever thy hand findeth to do, do it with thy might'."

*See "A New Brunswick Memorial", Canadian Geographical Journal, December, 1949.

BIRD SERIES — Part VIII

Photographs and Notes by W. V. CRICH

VIRGINIA RAIL

RALLUS LIMICOLA LIMICOLA **(Lat. *rallus* rail; *limicola* mud dweller)**

VIRGINIA RAILS are shy, secretive marsh birds. Although seldom seen, their "cut-cutta-cutta" and "wak-wak-wak" is often heard. If one of them is surprised at close range, it will fly very feebly a few feet and then quickly drop back into the marsh. It has a long, slender, down-curved bill, red eye, and grey cheeks. The nest, found in fresh water marshes on or near the water, is constructed of water, weeds and grasses. Bulrushes or other plants bent over the nest and a ramp of weeds built up to the entrance provide effective concealment.

The Virginia Rail breeds from the southern provinces of Canada, south to northern lower California, Utah, Missouri, southern Illinois, Kentucky, New Jersey and eastern North Carolina. It winters from Utah and Colorado to lower California, Guatemala and the lower Mississippi valley States, and from North Carolina to Florida.

A brief word of how and where I secured the photographs of the Rail reproduced in the Journal may be of interest. I drove to the mouth of the Humber River (just west of Toronto) where it enters Lake Ontario. At this point there is a sand-bar a short distance from the shore; the intervening space is covered with shallow water, in which grow bulrushes, pickerel weed, arrow leaf, and other marsh plants. I parked my car by the breakwater, changed my clothes, and left my boots and socks on the seat. With trousers rolled to the knees, I waded out to the sand-bar, erected my pup-tent for a blind, camouflaged it with bulrushes and sedges, then lay on my ground-sheet, camera ready, waiting for the birds.

Some Coots came out and picked in the mud with their white chicken-like bills, also my Virginia Rails. All was well, and I was enjoying myself and getting my pictures—when I sensed that I was not alone. I glanced over at my parked car. Four stalwart members of the police force were peering over the breakwater into the deep water near the river mouth. Two others were looking in the car at my shoes and clothes on the front seat. I crawled out of the blind and shouted a cheery "hello" to them. They did not return in kind. "What on earth are you doing out there?" was the official response. "Photographing birds," I replied. "Come on, let's go; it's one of those fool naturalists," one said, as they stamped away to the squad car. But I got my pictures and here they are.

UPLAND PLOVER *BARTRAMIA LONGICAUDA*

In late spring the commuting birds arrive back at their northern homes to cheer us once again with their songs. These melodies all charm the heart of the naturalist, but none do it more thrillingly than the long-drawn, rolling, rich, mellow whistle of the Upland Plover. Once heard it is never forgotten.

The Upland Plover is a bird of the open fields and meadows. Once it appeared in tremendous numbers, but owing to greedy hunting it is no longer plentiful.

The bird itself is without any outstanding distinguishing marks, but the long neck and tail, along with its characteristic habit of holding its wings extended for some time after lighting, help to identify it. It is larger than a Killdeer. In colour it is a buffy brown.

Its nest is very difficult to discover. As one walks across a field where plover dwell, a warning signal is given by the mate on guard. Long before the nest is approached, the incubating bird has silently scurried through the grasses to appear, much perturbed, some distance away. The nest shown in the photograph was found in the following manner: A hundred-foot rope was slowly dragged across the meadow between two observers. The rope was watched continually. The bird heard the approaching rope but the sound, unlike footsteps, did not disturb her until the rope caught her under the chin and somersaulted her off her nest. The rope was immediately dropped and then the observers, passing along its length, found one bit of it resting right on the eggs. A hollow had been scratched in the ground about five inches in diameter and nearly three inches deep. It was well lined with dried grasses, and contained four eggs, quite large in proportion to the size of the bird. They were mottled with rich browns on a ground colour of buff.

Both adults share in the incubation and care of the young which appear towards the end of June. Although weak and ungainly, with extremely long legs, they follow their parents almost immediately in the search for food. Unlike the fast-running Killdeer young, which have smooth, hard surfaces to navigate, the young Upland Plover have great difficulty getting through the meadow grasses. The young birds are finely mottled with black, white and rich brown above, and blend in perfectly with their habitat.

About the middle of July, the old and young birds start assembling in small flocks to move off to their winter range in Argentina and Peru. There they are much sought after by market hunters as a table delicacy, and their survival depends on their frequenting remote regions.

EDITOR'S NOTE-BOOK

E. P. Weeks is a native of Prince Edward Island. After receiving his B.A. from Mount Allison University in New Brunswick, he continued his academic career at Oxford, where he gained the degrees of M.A., B.Litt. and D.Ph. After working for six years for the British Government, Dr. Weeks returned to Canada where, since 1946 he has been in the service of the Canadian Government as an economist.

* * *

B. J. McGuire began his literary career while still at the University of Toronto, where he was editor-in-chief of the daily publication *The Varsity*. After graduating Mr. McGuire was employed for some time in newspaper work before he joined the staff of The Aluminum Company of Canada. For several years he was occupied with public relations work for that company in Toronto, Kingston and Montreal. Mr. McGuire is now a director of Public and Industrial Relations Limited and much of his writing is of an educational nature.

* * *

Robert J. C. Stead is a writer who needs no introduction to readers of the Journal. Settled in his native Ontario, Mr. Stead, who has now retired from official life, devotes himself to literary work.

* * *

AMONGST THE NEW BOOKS

The Land of Italy

by Jasper More

(Batsford, London; Clarke Irwin, Toronto, $4.75)

"This book," we are told by its publishers, "is addressed primarily to the intelligent reader or traveller who has as yet no close knowledge of the Land of Italy. Its purpose, apart from the pleasure which its reading will afford, is to inform the prospective visitor of what he may expect to find in each town or district, so that he may decide which part of the country to visit and be certain of seeing everything worth while during his stay."

Thus auspiciously launched, we cast an appreciative eye over the end maps and settle down to the excellent Introduction. Mr. More is obviously the ideal writer to tackle a book of this kind, for he has lived and travelled in Italy over a period of years and possesses a wide knowledge of the country's history, art and architecture and a sympathetic insight into the varied characteristics of its people. In addition, he has a trenchant wit and a rare ability to recreate scenes and situations — which fortunate combination of literary gifts is displayed to full advantage in the Introduction, wherein we are provided with a wealth of information about recommended methods, means and times of travel, suggestions regarding restaurants and recreation, and a brief but excellent essay on the historical, artistic and religious background of Italy.

We then settle down to the serious business of travelling chapter by chapter, district by district and, frequently, village by village through Italy, Sicily and Sardinia. Within these pages is packed a prodigious wealth of information, chiefly architectural, and we cannot help being impressed by the author's industry and detailed knowledge of the country as he describes for us church after church and castle after castle. But, alas, in an attempt to cover overmuch territory in a given length of text. Mr. More's genius, essentially expansive by nature, is restricted to catalogue proportions. And what is the result? With so great a number of villages per page (and so limited a supply of suitable commendatory adjectives in the English language) far, far too many are labelled "picturesque" — surely the most reprehensible of all descriptive terms (excluding, possibly, "quaint"); while those delightful gems of interwoven historical reminiscence and spicy anecdote that studded the Introduction are here relegated to the occasional footnote in fine type.

Strangely enough, the author himself deplores the lack of recent good travel books dealing with Italy — apart from those of the guidebook variety; yet, far from leaving unto Baedeker the things which are Baedeker's, he consistently invades the territory of the latter. It is only when dealing with the larger cities (with Rome, Florence, Venice, Milan) that he gives free rein to his infectious enthusiasm and powers of vivid description; and these sections are so admirably written that one cannot but deplore his frequent sacrificing of quality to the demands of quantity elsewhere.

It would, however, be ungracious to end on an over-critical note, for Mr. More's book, like a rich plum pudding, is full of good things. Well organized and generously informative, it is provided with a detailed index — though not with a list of the illustrations, which, as ever in a Batsford publication, are of outstanding excellence. Four coloured reproductions and about 160 black-and-white photographs supplement the text in providing for potential pilgrims an invaluable record of the magnificent architectural and scenic heritage of the Land of Italy. K.C.

* * *

St. Ignace, Canadian Altar of Martyrdom

by William Sherwood Fox

(McClelland & Stewart, Toronto, $3.00)

Canadian historians and archaeologists have for many years studied and explored the ancient lands of the Huron Indians in Simcoe county, Ontario. With the aid of such records as the Jesuit *Relations*, Champlain's narratives, the historical works of Du Creux, Sagard and Parkman, along with unpublished manuscripts pre-

served in libraries and archives, excavations were made and institutions vied with private citizens in the progressive uncovering and restoration of the Huron villages where the French Mission which ended so tragically in 1649 spent twenty heroic years. In all these writings there was evident an ardent desire to find "the holiest spot of all", the place where St. Jean de Brébeuf and St. Gabriel Lalemant gave up their lives three hundred years ago. For more than a century searchers have striven to discover St. Ignace. It does not require much imagination to understand the very great difficulties inherent in such a quest when one considers how few vestiges could remain after three hundred years, particularly in view of the frail and perishable character of the Indian dwellings and the complete destruction of the entire community perpetrated by the Iroquois. That these difficulties were at last overcome was due to the many earnest collaborators in the work, to whom Dr. Fox pays fitting tribute in his introduction.

His chief collaborator, both in the excavation and in the preparation of the book, was Mr. Wilfrid Jury, Curator of the Museum of Indian Archaeology and Pioneer Life of the University of Western Ontario. As President of that University from 1927 to 1947, Dr. Fox's training in classical archaeology was there applied to the very different task of investigating American Indian life and remains. In a chapter entitled "How St. Ignace is identified" the author reviews some of of the difficulties that confront one in striving to reach conclusions on the archaeology of the Woodland Indians, and the special technique that is required to find the deeply-hidden traces of their long-vanished villages and interpret them convincingly.

Fortunately this special technique was developed to a marked degree by the late W. J. Wintemberg, an outstanding authority on Canadian archaeology. A request to the National Museum of Canada enlisted his aid in following up a clue brought to Dr. Fox and his colleagues in 1934 by Alphonse Arpin and Thomas George Connon, to whom the book is dedicated. The excavations carried out by Mr. Wintemberg during the summers of 1937 and 1938 convinced him that the actual site of St. Ignace had been found. His death left the work incomplete, but it formed the basis of subsequent investigations by Mr. Jury and his helpers who in their "Campaign" of 1946 found within the palisade traced by Mr. Wintemberg fortifications, gateways, a drying scaffold and other evidences of habitation, chiefly houses. In papers presented to the Royal Society of Canada in May 1941 and May 1946 there were revealed to the learned world all the facts concerning St. Ignace that have been uncovered by field-workers and delvers in archives. Since these papers were, as Dr. Fox points out, presented in the unavoidably severe manner of archaeological science, he felt that a book should be written setting forth the facts in a manner calculated to interest a wider public.

This book has now been published. Convenient in size, beautifully designed and printed, it will prove an excellent guide for pilgrims to Huronia and the interest it creates should add considerably to their numbers. In Part I Dr. Fox tells the profoundly moving story of the Jesuit Mission to the Indians of New France from its short-lived establishment in Acadia to the twenty years of heroic work among the Hurons, ending in martyrdom. The reader is now prepared to share in the experiences of those who took part in "The Quest for and the Finding of St. Ignace", which constitutes the second part of the book.

The plates which are grouped together at the end of Part II include fine reproductions from the Public Archives of Canada, portraits of St. Gabriel Lalemant and St. Jean de Brébeuf, the ruins of Fort Ste. Marie and a famous Flemish engraving of the Martyrdom published in 1664 by Father Du Creux; also several photographs taken by Mr. Jury. The end-paper map of Huronia and the ground plans of St. Ignace and some of its buildings further elucidate the fascinating record. The bibliography, footnotes and index are scholarly and add to our already great debt to the author and his able collaborators.

F. E. FORSEY

* * *

Trees of the Countryside

by Margaret McKenny

(McClelland & Stewart, Toronto, $3.00)

The first thing to catch the eye in this book is the series of interesting lithographs by Alice Bird. Most of them are in a fairly high key with the result that there is a lightness, an atmosphere, about them seldom attained by other artists. Accompanying them are skilful drawings of the leaves, flowers, and seeds of the trees discussed.

Miss McKenny writes interestingly of twenty-nine trees, most of them familiar, some of them, such as the Lombardy Poplar and the Blue Gum, not native, and one, the Sahauro Cactus, hardly a tree. The purpose was to interest children in trees, but the text and illustrations are both likely to please adults as well, and that is most certainly not to be considered a fault.

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